Eventide®

BD600 BROADCAST PROFANITY DELAY

OPERATOR'S MANUAL

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Chapter 1 Introducing the BD600

The Eventide BD600 is designed to enable a broadcast licensee to prevent obscene and/or libelous material from being transmitted over the air. It does this by automatically delaying program material by up to 80 seconds, allowing time for a monitoring operator to decide whether the material being delayed fits into either category.

If objectionable material is heard, electronic circuitry allows all or a portion of the delayed audio to be "dumped" and the program resumed without interruption. The delay time is increased automatically and gradually after the "dump" occurs. A remote control option allows an external relay to be attached to prevent uncontrolled sources, such as telephone callers, from being aired until the delay time is again long enough to provide protection.

The BD600 has a number of special functions to make it convenient to use: the WAIT AND EXIT function can be used to synchronize to a network or live signal feed, and the RAMP TO ZERO function can be used to decrease the delay time to zero gradually when it is no longer needed for a safety margin.

This manual discusses the use and operation of the BD600. All of the functions are presented in detail, which may make the manual seem somewhat forbidding. However, the unit is very simple to use and the apparent complexity portrayed in this manual is due to our desire to offer complete and accurate information.

BD600 Features:

- Up to 80 seconds of stereo audio delay
- Allows multiple DUMP operations. The DUMP function may be configured to delete a delay amount between 1.0 seconds and 10 seconds
- REBUILD (catch-up) provides fast recovery from a DUMP or SNEEZE while a show is in progress
- RAMP TO ZERO reduces the delay slowly using the same process as Rebuild
- SNEEZE function replaces microphone mute switch and allows short interruptions to be unnoticeable
- WAIT FOR SAFE function allows starting a show with a safe amount of delay
- WAIT AND EXIT drops from full delay to zero in real time
- PANIC feature dumps all delayed audio and plays jingle from plug-in card or mutes output for fixed time while delay rebuilds
- Micro Precision Delay mode allows a front panel selectable delay between 10mS and 10.0 seconds in steps of 1uS. This is useful for HD audio and other applications requiring precise audio synchronization
- Broadcast delay features can be used for smooth entry and exit to and from Micro Precision Delay mode
- Large numeric display shows amount of delay
- 24-bit Analog to Digital and Digital to Analog converters
- AES/EBU digital audio input and output
- 44100 or 48000 samples per second internal sample rate or set externally by AES or Wordclock inputs
- Front panel configuration and display of audio input and output attenuation
- Remote control inputs to trigger SNEEZE and DUMP or other functions
- Relay contacts to signal safe condition and DUMP button actuation or other statuses
- RS232 remote control
- Compact Flash card for jingle play back and software maintenance

Optional Features:

- Remote Control features including:
  - RS232 feed delayed by length of delay to drive clock or other devices
  - 16 programmable remote isolated inputs on rear panel connector to drive internal functions or act as source for delayed outputs
  - 16 programmable outputs to trigger relays, configurable to indicate different timing conditions including status of all processes, bypass mode or delayed version of inputs
  - Station Break and other insert operations

Front Panel

See *Chapter 2* for in-depth explanation of the following controls, or look up individual terms in the Index.

The front panel buttons have indicator lights which are lit when a function is available, with the exception of BYPASS, which is always available.

A flashing light indicates that the function is running. Pressing a button when it is flashing will cancel the function.

The CONFIG button and *configuration* mode are intended to be used by an authorized operator only and thus their operation is intentionally less obvious. See Chapter 3 for *configuration* mode information.

Since the BD600 can serve as a broadcast profanity delay or as a precision fixed delay, many of the buttons have multiple functions, including navigating the configuration menus (discussed in Chapter 3). Each of the buttons reflects its profanity delay function.

At times during start-up, the display will scroll text giving a question requiring a yes/no answer. At these times, the WAIT AND EXIT button will flash, indicating "yes" and the REBUILD button will be lit solidly, indicating "no." All other buttons will be off. Usually, the "yes" answer is expected.

2 Input status *4 Level Meters* *6 WAIT FOR SAFE* *8 REBUILD* *10 SNEEZE* *12 Delay numeric display* *14 Dump*

1 BYPASS *3 CONFIG* *5 PANIC* *7 WAIT AND EXIT* *9 RAMP TO ZERO* *11 Delay bar graph* *13 Card slot*

1) BYPASS Button

Toggles the unit in and out of *bypass*. While *bypassed*, the LED flashes and the audio path through the BD600 is bypassed either electronically or by a relay. Pressing this button while *bypassed* will take the unit out of *bypass*. This button is also used to exit from *configuration* mode.

2) Input Status

These LEDs indicate whether the BD600 is configured for analog or digital input. If the digital input LED is flashing, it indicates that the unit is not locked to the sample sync input.

3) CONFIG Button

Enters *configuration* mode.

⇒ *See Chapter 3 for information on Configuration.*

4) Level Meters

Two 10-segment LED bar graphs show audio input levels. These graphs act as meters and may be used to align the equipment to ensure that appropriate audio levels are presented to the BD600.

5) PANIC Button

In *profanity delay* mode, dumps the entire delay, and either plays a jingle from the card or mutes the output for a configurable period. During this process the delay is filled in real time.

⇒ *See More Information on the PANIC feature on page 14*

6) WAIT FOR SAFE Button
In *profanity delay* mode only, initiates or cancels the *wait for safe* mode, which is used to start a show with a safe amount of delay.

7) WAIT AND EXIT Button
In *profanity delay* mode only, initiates or cancels the wait and exit process, which exits quickly from delay.

8) REBUILD Button
In *profanity delay* mode, starts or stops rebuilding the delay. In *precision delay configuration* mode, decrements the current delay amount digit.

9) RAMP TO ZERO Button
In *profanity delay* mode, instructs the unit to start or stop ramping toward 0.00 delay. In *precision delay configuration* mode, this button increments the current delay amount digit.

10) SNEEZE Button
If the unit is configured as a profanity delay, this button is used to cut off microphone audio. If delay is greater than 0.00, the unit will reduce the delay while SNEEZE is held. In *configuration* mode, this button sets an individual value back to factory defaults.

11) Delay Amount Bar Graph
This 15-segment LED bar graph indicates current delay as a fraction of maximum delay or, in *precision delay configuration* mode, indicates which digit of the delay value is selected. This display is also used for visual cues during *configuration* mode. The right-hand segment also flashes to indicate card and serial remote control activity.

12) 4-Character Display
The 4-character LED shows delay amount values, text information, and configurable parameter values.

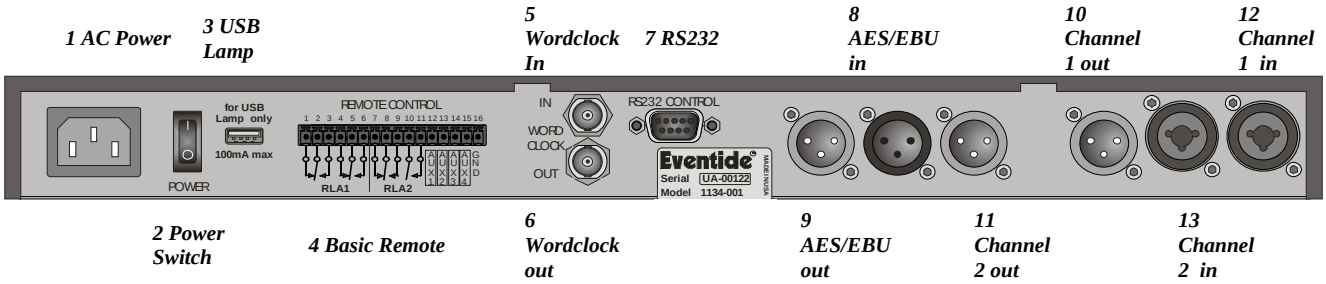
13) Card slot
A Compact Flash card (of the type often used for digital cameras) may be used to store jingles for play back during PANIC operation, and also for software maintenance.

14) DUMP Button
In *profanity delay* mode, deletes a segment of audio in order to stop an undesirable audio segment from being transmitted. This button is illuminated when the unit is in *profanity delay* mode and the amount of delay meets or exceeds a preset *safe* amount. It is also illuminated in *precision delay* mode when the delay is at the configured amount.

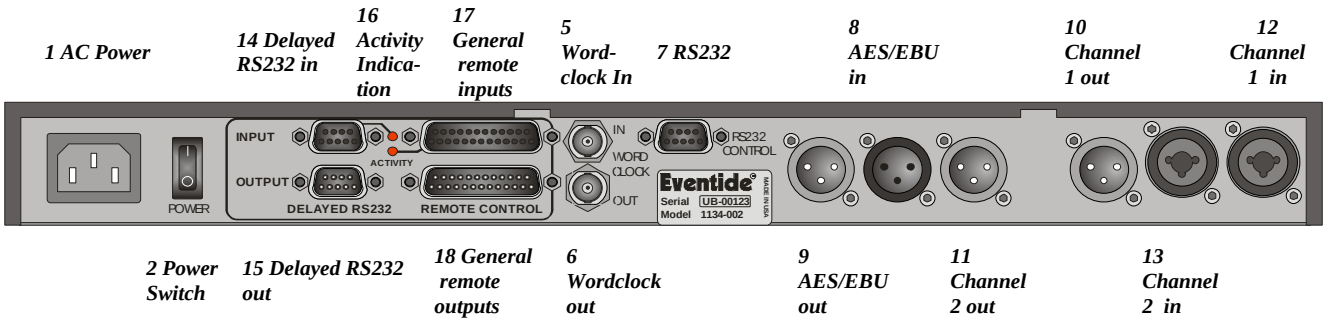
Rear Panel

The BD600 is supplied in two versions: the Basic Remote model and the Extended Remote model. These differ mainly in their back panel connections and remote control features.

BD600 Basic Remote



BD600 Extended Remote



1) AC Power

IEC standard 3-prong connector. The center post is chassis ground. When power is not connected, the unit is bypassed - the analog and digital inputs are connected to their respective outputs through a relay.

2) Power Switch

This controls the AC power into the BD600. When the power switch is off, the unit is bypassed, as described above.

3) USB Lamp

This is a standard USB connector into which a USB-powered lamp may be connected to enhance rear panel visibility in enclosed spaces. It supplies power only and cannot be used for USB communications.

4) Basic Remote Connector

The BD600 has a standard remote control/signalling output. This allows remoting of the dump and sneeze functions and output of safe status.

These functions can be changed in *configuration* mode.

⇒ *See page 28 to configure the Basic Remote.*

5) Wordclock in

An external Wordclock signal may be used as a sample clock source. A Wordclock signal will usually offer a more stable clock source than that supplied by an AES/EBU signal.

⇒ *See page 9 to use Wordclock*

6) Wordclock out

The BD600 outputs a Wordclock signal of its current sample clock – this may be used to synchronize other equipment to it.

7) RS232 Connector

This is a female 9-pin DB9 connector supplied to connect a remote computer or terminal. The remote computer or terminal can control all functions of the BD600 including configuration.

⇒ *See page 32 for information on RS232 remote control..*

This connector may also be used for software maintenance purposes.

Digital Audio Inputs and Outputs

These are XLR differential AES/EBU connections for stereo input and output channels.

8) AES/EBU in
9) AES/EBU out

Use these connectors to connect professional digital audio equipment to the BD600. The cables should be differential with a shielded twisted pair.

⇒ *See page 8 to configure the BD600 to use AES/EBU.*

Analog Audio Inputs and Outputs

These are XLR differential audio connections for two input channels and two output channels.

10) Channel 1 Output
11) Channel 2 Output

Male XLR connectors.

12) Channel 1 Input
13) Channel 2 Input

Female XLR connectors.

14) Delayed RS232 in
15) Delayed RS232 out

These are 9 pin DB9 connectors where the input is delayed by the amount of the delay and fed to the output, usually to drive a clock indicator showing the time of the delayed material. They can also be used to delay RS232 control signals.

16) Activity Indication

These LEDs will flash when there is a change of state on the adjacent inputs.

17) General Remote Input

This DB25 female connector has 16 bipolar optoisolated inputs which can be individually programmed for use to either control BD600 functions or to feed the corresponding General Remote Output.

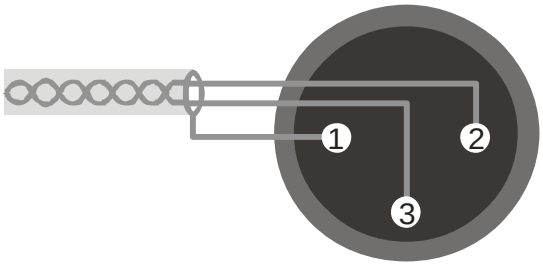
⇒ *See page 31 to configure these inputs.*

18) General Remote Output

This DB25 male connector has 16 open collector outputs which may be individually programmed to supply BD600 status or a delayed version of the corresponding input.

Audio Connection

Analog

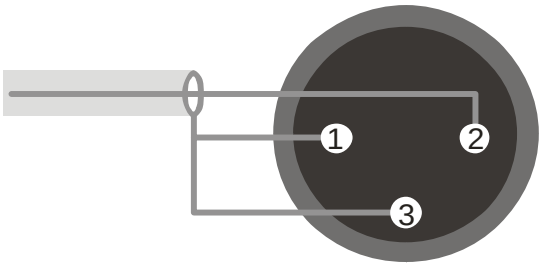


Male XLR output, balanced

The BD600 provides XLR differential audio connections for two input channels and two output channels. When bypassed, the audio pins of each input channel are connected to the audio pins of each output channel using a relay. The unit is automatically bypassed when power is disconnected or turned off. Note that neither pin 2 nor pin 3 should be left unconnected or you will get more noise and distortion than signal. Be aware that the ¼" jack inputs are <u>not</u> covered by the bypass function and should not normally be used.

Analog Outputs

These male XLR connectors provide a differential balanced audio output with a maximum level of +22dBm and a nominal level of -4dBm. Pin 1 is grounded to the case of the external XLR connector. Pin 2 is +phase and pin 3 is –phase.

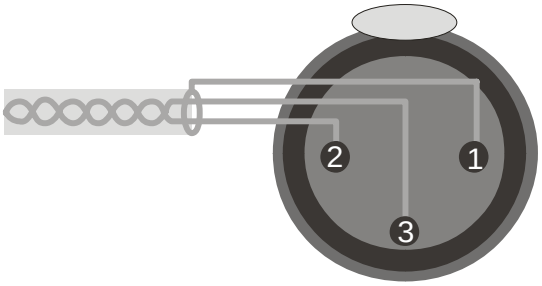


Male XLR output, unbalanced

Each connection may also be used as an unbalanced line. The BD600's XLR analog audio output connectors are male. Pin 1 is grounded. Connect pin 2 to your center conductor and connect pin 3 to pin 1.

Analog Inputs

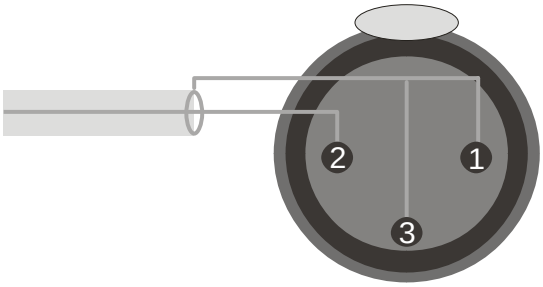
These female XLR connectors provide differential balanced audio input. The input level has a maximum value of +22dBm and nominal level of -4dBm, but an internal attenuator allows these levels to be changed. Pin 1 is grounded. Pin 2 is +phase and pin 3 is –phase.



Female XLR input, balanced

Although the inputs of the BD600 are balanced, you can still use them with an unbalanced line. The BD600 XLR analog audio input connectors are female. Pin 1 and pin 3 are grounded. Pin 2 is your audio signal.

In the case of an XLR to XLR balanced line (differential) cable the shield should be left disconnected on one end (usually on the end connected to an instrument output). This helps to prevent ground loops. The use of balanced connections is recommended.



Female XLR input, unbalanced

Digital

These cables are differential with a shielded twisted pair. For short distances microphone cables can be used, but for longer distances and permanent installation a digital grade twisted pair cable is recommended.

AES/EBU input, XLR

The BD600's connector is female. Pin 1 is shield, 2 and 3 are differential.

AES/EBU output, XLR

The BD600's connector is male. Pin 1 is shield, 2 and 3 are differential.

Chapter 2 Operation

This chapter describes how the BD600 is operated from the front panel using factory default configuration values. Optional remote control and configuration are described in later chapters and appendices.

Installation

Rack Mount

The BD600 should be mounted in a standard 19-inch rack using washers to avoid damaging the front panel overlay. The rack should be well ventilated and in a dry and dust-free environment so heat and moisture won't cause damage or degradation of performance.

Connect AC and Turn On Power Switch

The BD600 will automatically configure itself to operate over an AC supply voltage range between 100V and 240V, 48-62Hz.

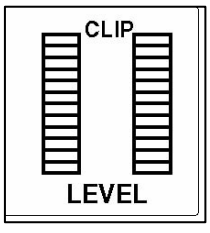
Since the unit is electrically out of the audio path when in *bypass* mode, there is no reason to need access to the rear panel power switch. The power-up mode is selected by the configuration and is the same regardless of whether power is applied via the rear panel switch or via connecting the AC to an already switched-on unit. The unit may be left powered on even if the rack's power is to be disconnected.

Immediately after the unit is switched on, the front panel will be fully illuminated. After a second, the display will change to show `LOAD`, followed by the software version number. At this time the unit will read the front panel buttons. If any buttons are pressed, the unit will perform a special start-up function (see *Appendix D*). If no buttons are pressed, the unit will complete its start-up, showing `LOAD` again. After a second, the display will show −−−and the BYPASS button should be illuminated. This combination of LEDs indicates that the unit is powered on and in *bypass* mode.

⇒ *Note that the BD600 can be configured to go immediately into on-line mode - see Chapter 3 for details.*

Level Meters

There are two 10-segment LED bar graphs to display input level information. These graphs act as meters and may be used to align the equipment so appropriate audio levels are presented to the BD600. The meters indicate the levels at the digital signal processor and are calibrated in decibels. The top LED is red. The next two are yellow, and the bottom seven are green. The red LED is lit if the level reaches clipping. The remaining LEDs indicate approximately -3dB, -6dB, -9dB, -12dB, -15dB, -18dB, -21dB, -24dB, -40dB.



When the BD600 is being operated correctly, most of the LEDs will be lit (NOT the red ones) when a loud signal is being received.

Note that the meters show the signal level AFTER the input gain control, so if a VERY high level signal is applied when this control is set to attenuate, it is possible to overload the inputs without this being visible on the meters.

Connecting Audio Inputs and Outputs

Connect analog audio inputs

Connect audio inputs to the two female XLR connectors on the rear panel. It is safe to connect and disconnect to the rear panel while the power is turned on. The inputs will probably come from a mixer board. Supply an audio source at a level just below clipping. The BD600's level meters indicate input level. Adjust your audio source's output such that with a maximum input signal, the level meters have all of the green segments and both of the yellow segments lit, but not the red segment.

If your audio source cannot be adjusted or does not have the range to achieve a low enough or high enough signal, you must adjust the BD600's input trim. The BD600 has up to 40dB of input trim which is controllable from the front panel *configuration* mode. At the factory the input trim is set to unity gain. To add attenuation, press the BYPASS button once or twice until the BYPASS button's LED is flashing – the unit is now bypassed. Now press the CONFIG button to enter *configuration* mode and press it again to go up through the configuration levels until you reach `3 AU.` Press the WAIT AND EXIT button four times to go to the `IN G` variable. Press the REBUILD or RAMP TO ZERO button to step through the attenuation values to achieve the desired amount of trim attenuation or gain. The available range is -30dB (attenuation) to 10dB (gain). The trim adjustment affects the level meters as the adjustment is made. Note that since the unit is bypassed (not processing audio), the output level is not affected by this adjustment unless *bypass* mode is configured for `DSP` bypass. The level meters will show the input levels as you make this adjustment.

⇒ *See Chapter 3 on page25 to configure bypass mode.*

In most cases, the combination of the input and output gain settings should be such that there is no level change when going in or out of bypass.

Once the adjustment is complete, press the BYPASS button twice to place the unit *in-line*.

Connect analog audio outputs

The BD600 has an output level control, again operated from *configuration* mode, which can reduce the output audio by up to 30dB or increase it by up to 10dB. The factory default is *no* attenuation.

To adjust the audio output attenuation, repeat the above process except choose the `OUTG` variable instead. The range of this variable is -30 thru +10dB. Note that since the unit is *bypassed* (not processing audio), the output level is not affected by this adjustment. The unit will have to be placed *in-line* (press BYPASS twice) to test the new value, unless the unit has been configured for `DSP` bypass.

Connect digital audio inputs

Connect the digital audio input to the female XLR connector on the rear panel. It is safe to connect and disconnect to the rear panel while the power is turned on. There is no level control for the digital inputs as these are assumed to be suitably scaled at source.

To enable the digital inputs and disable the analog inputs, or vice-versa, press the BYPASS button once or twice until the BYPASS button's LED is flashing, then press the CONFIG button until you see `3 AU`, then press WAIT AND EXIT to see `INPT.` Now use REBUILD or RAMP TO ZERO to select `ANA` or `DIG` as desired. Changing the input format will automatically set the SYNC variable to `48K` or `AES` as appropriate (see below).

Connect digital audio outputs

Connect digital audio output from the male XLR connector on the rear panel. It is safe to connect and disconnect to the rear panel while the power is turned on. There is no level control for the digital output as it cannot overload. The digital audio output is always enabled, whether analog or digital input is in use.

Selecting the sample rate

The BD600 uses digital processing for all internal operations and its sample rate can be selected in various ways. The digital output is also at this sample rate.

To change the sample rate, press the BYPASS button once or twice until the BYPASS button's LED is flashing. Now press the CONFIG button to enter *configuration* mode and press it again to go up through the configuration levels until you reach **3AY**. Press the WAIT AND EXIT button twice to go to the **SYNC** variable. The options are:

44.1K	The sample rate is set to 44.1kHz using an internal quartz crystal source.
48K	The sample rate is set to 48kHz using an internal quartz crystal source.
AES	The sample rate is determined by the AES input.
WCLK	The sample rate is determined by the Wordclock input.

Note that automatic internal sample rate conversion allows satisfactory reception of an AES signal even when the sample rate is not set to **AES**.This means that the unit could be set to **48K** and satisfactorily receive a digital input at 44.1kHz. Best results with digital inputs, however, will be achieved when the sample rate is set to match the input signal. Wordclock will usually give a more stable sync source than the AES signal.

If either **AES** or **WCLK** is selected but does not have a suitable input signal, the DIGITAL input status LED will flash, indicating lack of lock (meaning that the BD600 is unable to synchronize with the signal).

During normal operation outside *bypass* mode, if the unit is synchronized to AES or WCLK and the signal becomes unsuitable, the display will scroll **NO LOCK**. The system will then revert to the configured fallback mode (**FLBK**). This may be either **MUTE** or **ANA**log. If ANAlog is selected, during fallback mode the analog input LED will light while the digital LED will flash.

Notes and Warnings for AES/EBU Operation

Neither the input attenuation (**IN G**) configuration parameter nor the output attenuation (**OUTG**) configuration parameters affect AES/EBU outputs.

The AES/EBU source must be stable before putting the unit in-line. If your AES/EBU source's sample rate changes, or if the AES/EBU is disconnected, or if the AES/EBU audio source is turned off while the BD600 is processing audio (in-line and powered on), the BD600 may add artifacts to the audio, or may indicate a failure with an error message (**NO LOCK**).

The BD600's purpose is to store audio and play it back with a delay. If the rate of audio into the unit changes while audio is stored, the audio played from the delay will change pitch. Thus, if the AES/EBU source's sample rate changes or stops altogether (cable is disconnected), the BD600 may play out audio with a significant pitch shift! If the unit falls back from AES/EBU to analog input at a different sample rate, there will be a pitch change in the audio already delayed through the unit. Your digital system must be set very close to either 44100 or 48000 samples per second, or using the fallback option in the BD600 will allow several seconds of pitch changed audio to pass.

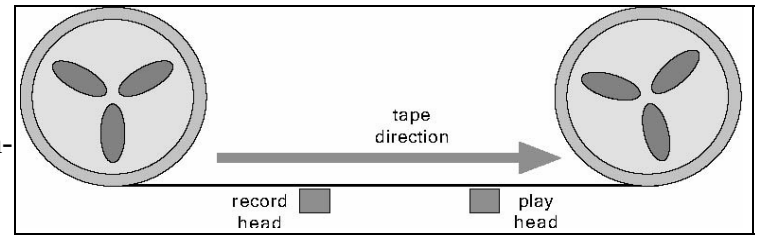
From the above, it will be clear that when using digital audio on air it is essential that all signals are of suitable quality and that a solid lock be achieved. These issues apply to all digital audio connections, not just those involving the BD600.

Understanding BD600 Profanity Delay Functions

This section uses a tape recorder delay as an analogy to describe how the Eventide digital broadcast delay behaves when used as a profanity delay. The digital broadcast delay can be likened to a tape recorder with some new features. A basic tape recorder profanity delay would look like this:

When the delay is placed in line, the microphone (audio source) is connected to the record head while the transmitter is connected to the play head. This introduces a delay determined by the speed of the tape and the distance between the tape heads.

In our analogy the speed of the tape is constant. The distance between the heads is measured in seconds and there is enough room between the tape heads for eight seconds of delay. Factory default values are used whenever a time or duration is mentioned – for example, while the SAFE time is stated as four seconds, it can be configured to a different value.



The Eventide system offers the following features:

REBUILD - Increase the delay gradually

This feature allows the time between the play head and record head to be increased, in a subtle and transparent way. At the start the play head and record head overlap (no delay). The record head is slowly moved to the left until eight seconds of delay exists. The Eventide rebuild process does this in about 120 seconds *without causing a pitch change* in the audio. Rebuild is used to recover from a *dump* without having to go to a break. It can also be used to increase the delay time to allow for multiple dumps.

RAMP TO ZERO - Decrease the delay gradually

This feature is similar to *rebuild* except that the record head is moved to the right, in a subtle and transparent way, again taking a few minutes. When the record head reaches the play head, the unit is at live. RAMP TO ZERO is used to exit from delay when the call-in portion of a program is over.

WAIT FOR SAFE - Bring delay from 0 seconds to 4 seconds quickly

When the *wait for safe* process is started, the tape is bypassed so the transmitter gets live audio. The record head is moved to the left by 4 seconds. After 4 seconds of recording, the transmitter is reconnected to the tape delay. There is now a 4-second delay. Note, since the initial 4-second segment of audio will be repeated at the play head, it is up to the user to prevent the live audio from going over the air. This feature is used to start a show coming from a network news feed, traffic report or other non-delayed program.

WAIT AND EXIT - Decrease the delay to 0 seconds quickly

This front panel feature is a method of quickly reducing the delay to 0.00 seconds. This process marks where on the tape the record head was when *wait and exit* is started. When that piece of tape reaches the play head, the record head is moved to the play head, decreasing the delay suddenly to 0.00 seconds. Use this command when a call-in show needs delay but where a break to non-delayed operation is required.

SNEEZE - Edit the delay before a bad noise happens

This feature is used to stop the record process temporarily. While the SNEEZE button is pressed, the record head moves toward the play head at the same speed as the tape, not recording any audio, until the SNEEZE button is released (at which point the record head stops), or until the record head reaches the play head, at which point silence is played out.

DUMP - Edit the delay after a bad noise happens

DUMP is used to edit several seconds of audio from the delay. Pressing DUMP moves the record head four seconds toward the play head (or up to the play head, whichever is less). This causes the most recent four seconds of audio from the microphone to be discarded.

PANIC – lose all delayed audio and play a jingle while delay is rebuilt

The PANIC function allows recovery from an undesirable signal by instantaneously moving the record head up to the playback head to dump all the delayed material. It then moves the record head a distance from the playback head corresponding to the length of a jingle or configured mute time.
It then either plays a jingle from a Compact Flash card or mutes the output for a configurable time, allowing an external cart machine to be cued.
Once the jingle or mute is complete, the delay will be partially filled, allowing the show to continue seamlessly after the inserted jingle.

⇒ *See page 14 for more information on the PANIC feature.*

Operating as a Profanity Delay

The BD600 may be used as a broadcast profanity delay - this is its primary function and factory default mode. When power is first applied to the BD600, the unit's audio inputs and outputs are bypassed through a relay. Pressing the BYPASS button places the unit in-line with 0.00 delay. If the audio levels are adjusted properly, there should be no perceptible difference when the unit is switched in. Note that since the BD600 by default uses true relay bypass, there might be a slight click. The 4-digit display will now read 0.00 which indicates no delay. The red indicators on several of the buttons will be lit, showing which buttons are valid choices. The lighting of the indicators changes depending on the BD600's state (or mode). Since the unit is at 0.00 delay and in-line, it will be in *live* mode. The following is a list of the few different modes in which the unit may be placed:

⇒ *Note that the BD600 may be configured to power up or exit bypass in different modes. See Chapter 3 Configuration for more details.*

Modes

- *bypass and configuration* - delay is set to 0.00 seconds, the audio is bypassed directly from input connectors to output connectors.
- *live* - bypass relays are open (unit is in-line), delay is set to 0.00 seconds.
- *static* - bypass relays are open (unit is in-line), delay is not changing.
- *rebuild* - bypass relays are open (unit is in-line), delay is slowly increasing.
- *ramp to zero* - bypass relays are open (unit is in-line), delay is slowly decreasing. Unit goes to *live* when it reaches 0.00 delay.
- *wait for safe* - bypass relays are open (unit is in-line), delay is filling with audio, but outputs are seeing input audio without delay. Unit switches to *rebuild* mode when safe delay time is reached. If wait for safe is cancelled, the unit will return to *live* mode.
- *wait and exit* - bypass relays are open (unit is in-line), input audio is not going into delay, but output audio is coming from the delay. The delay length is reducing rapidly. The unit will go into *live* mode when it reaches 0.00 delay. The SNEEZE button is disabled. If wait and exit is cancelled, the unit will return to the delay value it had when wait and exit was started.
- *sneeze* - bypass relays are open (unit is in-line), input audio is not going into delay, but output audio is coming from the delay. The delay length is reducing rapidly. When the SNEEZE button is released the unit will go back to the previous mode.
- *panic* - bypass relays are open (unit is in-line), input audio is going into the delay but is not heard until *panic* mode is over. A jingle is played from the Compact Flash card or the outputs are muted. Once the jingle is complete or the configured mute period is over, the unit will enter *rebuild* mode.

Functions and Features

By default the BD600 is in *bypass* mode. Press the BYPASS button to put the BD600 in *static* mode. The delay is now at 0.00 seconds and there should be no perceptible difference between *bypass* and *static* mode. After delay build is initiated and until the delay is reduced to 0.00, all audio should pass through the BD600 before going to the transmitter to avoid audible discontinuities.

Starting a Show Segment with REBUILD

This process is used to start a show in a simple manner. The guest or dial-in caller is enabled in less than two minutes. The host customarily uses this period for an introduction or monologue.
As a show starts, the delay is set to 0.00. Pressing the REBUILD button starts a process by which the delay is slowly increased. During the rebuild process the REBUILD button's indicator will flash.
In less than two minutes the BD600 will have enough delay built up to be 'safe' for a caller to be placed on the air. The DUMP button will light up to confirm this and the delay amount will show 4.00 sec-

onds and be increasing. If so configured, a rear panel output line will allow an external relay to be closed, enabling the phone line.
After a few minutes, the delay will reach maximum and the REBUILD button's indicator will turn off. The rebuild process is complete, and the delay enters *static* mode. However, the unit remembers that it rebuilt to maximum, so, if SNEEZE or DUMP is used, after the SNEEZE or DUMP button is released, the delay will automatically rebuild back to maximum.

Starting a Show Segment with WAIT FOR SAFE

This process is used to start a show rapidly. The guest or dial-in caller are enabled immediately after the studio goes on air. Before beginning, the transmitter is not getting its source from the BD600.
The operator needs to know, or to set, the configuration value of *safe time* (default is 4.00 seconds).
At *safe time* (or more) seconds *before* the studio goes on-the-air the operator presses the WAIT FOR SAFE button.
The host begins talking immediately. When the DUMP button illuminates:
The WAIT FOR SAFE process has completed.
The SAFE relay output is enabled.
The engineer or host fades the output of the BD600 into the transmitter. (See note below)
The host may begin taking dial-in callers. The BD600 drops into *rebuild* mode and slowly completes building up to maximum delay.
Note: During the 4-second period that *wait for safe* is running and the WAIT FOR SAFE button's indicator is flashing, the microphone audio is passed directly to the BD600 outputs. It is usually undesirable to have that audio pass over the air. Use a mixer or other control to disable that audio until the show is scheduled to start.

Starting a Show Segment with PANIC

If a suitable jingle or other audio is recorded onto a Compact Flash card in the card slot, the segment may be started by hitting the PANIC button, causing play back of the jingle from the card. During this time the host may start talking, typically an introductory monologue, which will be recorded into the delay. Once the jingle has completed, the monologue starts to play out and the unit goes into *rebuild* mode.
⇒ *See More Information on the PANIC feature.on page 14*

Ending a Show Segment with RAMP TO ZERO

This process gradually reduces the delay and takes a variable amount of time up to a few minutes. During the show, the BD600 would usually remain in *rebuild* mode at maximum delay. Whenever SNEEZE or DUMP is used, the unit rebuilds back to maximum. To end the show, press RAMP TO ZERO. The delay will reduce in several minutes to 0.00 while the RAMP TO ZERO button's indicator flashes. During ramp to zero the DUMP and SNEEZE buttons will continue to be available, but an eye should be kept on how much time is actually still available to be dumped or sneezed away. To stop the ramp to zero process, press the RAMP TO ZERO button. The unit will go to *static* mode (delay not changing). The ramp to zero process may be resumed, or another function may be started.
Once the ramp to zero process is complete, the unit will be operating at zero delay (live).

Ending a Show Segment with WAIT AND EXIT

This process rapidly reduces the delay and takes the time displayed on the BD600's front panel indicator, typically 8 seconds or less.
At the end of the show, after the last word is spoken, press the WAIT AND EXIT button. All of the audio delayed in the BD600 is played out in real time until the delay reaches 0.00. The WAIT AND EXIT button's indicator flashes until the process is complete. Input audio is ignored by the BD600 dur-

ing this process. When the delay reaches 0.00, the unit goes into *live* mode at which time input audio is passed directly to the outputs.
If the WAIT AND EXIT button is pressed erroneously, the process may be cancelled by pressing the WAIT AND EXIT button again. The unit will go back to the delay it had before WAIT AND EXIT was pressed and will be *static* (delay not changing).

DUMP Button

This button has several functions. The primary purpose of this button is to stop a profanity from going out over the air. This button is illuminated when *in-line* with a safe amount of delay (specified by *safe time*). Here is a list of modes and how the DUMP button works in each:

In rebuild or ramp to zero

DUMP causes the unit to delete several seconds (configurable) from the delay line including the most recently input audio information. The amount dumped is configurable and defaults to 4.00 seconds. When the DUMP button is pressed, the dump amount is subtracted from the current delay. If the displayed delay is lower than the dump amount, the delay is reduced all the way to 0.00. After DUMP is released, the unit continues with the previous mode. Note: even if the unit is no longer rebuilding, having already reached full delay, the unit will still return to *rebuild* mode after DUMP is released.

In wait for safe

DUMP will cancel the *wait for safe* operation and return the unit to zero delay.

In precision delay configuration mode

DUMP causes the delay to be reduced to its minimum value (0.010 seconds).

In bypass, live, or wait and exit

DUMP has no function.

SNEEZE Button

This button is used to cover up a predictable interruption to a program like a sneeze, cough or comment to the caller or engineer, or some other undesirable noise. If the unit is *in-line* (not bypassed) in *profanity delay* mode and not in *wait for safe* or *wait and exit* mode, this button will stop accepting input audio while it is held. The delayed audio will continue to be played out, reducing the delay amount. This would make the listener unaware that the mute occurred. If the delay reaches 0.00, or is at 0.00 when SNEEZE is pressed, the audio is muted. When SNEEZE is released, the unit goes back to the interrupted mode. In simple terms – press button, sneeze, release button.

Delay Amount Display

The display consists of a bar graph and a 4-digit numerical display. The numerical portion shows the delay amount in seconds with optional fractions of seconds. The factory default is to show seconds and thousandths of seconds with the decimal point appropriately placed. The bar graph indicates what portion of maximum the unit is delaying. For instance, if the unit is delaying at 3.50 seconds and the unit is configured to have a maximum of 8 seconds of delay, 6 of the 15 bar graph segments are lit.
The display is configurable to be blank, or to show 1, 2, 3 or 4 digits of resolution of delay length. In bypass the display will show '----'.

If the unit is *in-line*, and configured to use AES or Wordclock as a sync source and it loses lock, the display will scroll "`NO LOCK`."

⇒ *See Notes and Warnings for AES/EBU Operation on page 9*

More Information on the PANIC feature

The PANIC feature is designed to offer some protection against undesirable input audio when the delay value is *unsafe*. It is also useful as a convenient way to get into delay at the start of a show.

Hitting the PANIC button causes the delay to be instantly set to zero and then filled with input audio in real time. During this time, a jingle may be played from the Compact Flash card, or the output muted.

If a suitable jingle file is selected on the card it will be played, and the *panic* mode will terminate at the end of playback. If the length of the jingle is greater than the configured maximum delay value it will play to the end, but the delay will only be filled to the configured maximum value.

⇒ *See Chapter 3 to select the jingle file.*

If no suitable jingle is selected on the card (or the card is not present) and the PANIC (**PANC**) time is not configured to **OFF**, the output will be muted for the PANIC time, allowing an external cart to be played if desired. After this time, the *panic* mode will terminate, with the delay filled to the configured PANIC time.

⇒ *See Chapter 3 to configure this.*

Once the *panic* mode has terminated, the unit will go to *rebuild* and the delay will play out, starting with the audio immediately after the PANIC button was hit.

If the PANIC time is configured to **OFF** and no suitable jingle is selected on the card, the PANIC feature will be disabled and the button will be unlit.

Jingle files on the card

Jingle files can be recorded on a PC (IBM-compatible Personal Computer) using any suitable software. These can be saved to a suitable Compact Flash (CF) card using a commercial CF card reader/writer. These are usually connected to the PC via USB (Universal Serial Bus) and are widely available.

The files must be 16-bit .WAV files longer than 1.0 seconds, created with the sample rate to which the BD600 is set. If these requirements are not met, either the BD600 will not recognize them, or they will be played at the wrong speed or level.

The BD600 can support up to four different jingles per card – they must be named ONE.WAV, TWO.WAV, THREE.WAV and FOUR.WAV respectively. These names may be in upper or lower case. The active jingle can be selected either by changing the configuration variable **JING**, or by remote control. If the selected jingle is either not valid or not present, or there is no card in the slot, a **BAD JINGLE** message will appear briefly.

⇒ *See Chapter 3 to configure this.*

⇒ *See Appendix A for information on remote control.*

Operation as a Micro Precision Fixed Delay

The BD600 may be used as a fixed stereo delay line, adjustable from 0.010 seconds to 9.999999 seconds, adjustable in microseconds (0.000001 seconds). Operation is straightforward, with several front panel buttons serving secondary duty as fixed delay controls.

There are two ways to enter *precision delay* mode – the first method is from *configuration* mode. Go into *bypass* mode. In *bypass* mode the display shows ——. Press the CONFIG button. This puts the unit into *configuration* mode (display shows **CONF**). Now press the CONFIG button again. You are now at the "on-line" configuration level (display shows **1 ON**). Now press the WAIT AND EXIT button. The display should now show **RUN**. Now press the RAMP TO ZERO button repetitively (stepping through run options) until the display shows **MPD**. Press the BYPASS button to exit *configuration* mode. The display should show ——. Now press BYPASS to put the unit *in-line*. The unit will be in *micro precision delay* mode.

To return to *profanity delay* operation, press BYPASS, then CONFIG twice, then WAIT AND EXIT. The display now shows **RUN**. Now press SNEEZE to return to the factory default setting of the *run* parameter. Now press BYPASS to get out of *configuration* mode.

The second way to enter *precision delay* mode is to select **MPD** as the maximum delay time. Then the maximum delay is determined by the fixed delay settings, and normal broadcast delay functions may be used to enter and exit *precision delay* mode. For example, if you REBUILD to maximum, once the fixed delay value is reached the unit will enter *precision delay* mode. RAMP TO ZERO or WAIT AND EXIT may be used to return to profanity delay functionality. In this mode, the fixed delay value becomes the SAFE value, and the DUMP button illuminates when it is reached.

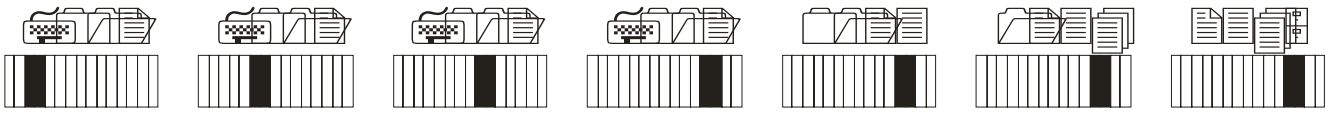
Controlling the Fixed Delay

In *precision delay* mode the profanity delay buttons have their normal functions for delay values of 100mS and above. Below 100mS they are inactive.

There is one addition – the CONFIG button is also active. If CONFIG is selected it will flash, and the meanings of the buttons change to allow the fixed delay value to be changed.
In this mode, the only operable buttons are BYPASS, WAIT FOR SAFE, WAIT AND EXIT, REBUILD, and RAMP TO ZERO. The buttons behave as follows:

- BYPASS takes the unit off-line. Always valid.
- REBUILD decrements selected delay digit. Valid if lit.
- RAMP TO ZERO increments selected delay digit. Valid if lit.
- WAIT FOR SAFE selects the digit to the left. Valid if lit.
- WAIT AND EXIT selects the digit to the right. Valid if lit.

The bar graph below the four-digit display flashes to indicate *precision delay configuration* mode and shows which of the four visible digits is selected for adjustment. The presence of the decimal point indicates that the four digits shown are the ones, tenths, hundredths and thousandths digits. Use the WAIT FOR SAFE and WAIT AND EXIT buttons to step through the selected digits. The following illustration shows a 7.012345-second delay as the WAIT AND EXIT button is pressed six times. Press WAIT FOR SAFE repeatedly to step back to the first digit. Press CONFIG again to get back to normal *precision delay* mode.



editing the first digit 1s of seconds	***editing the second digit 1/10 of seconds***	***editing the third digit 1/100 of seconds***	***editing the fourth digit milliseconds***	***editing the fifth digit 100's microseconds***	***editing the sixth digit 10's microseconds***	***editing the seventh digit microseconds***

Notes on Precision Delay mode

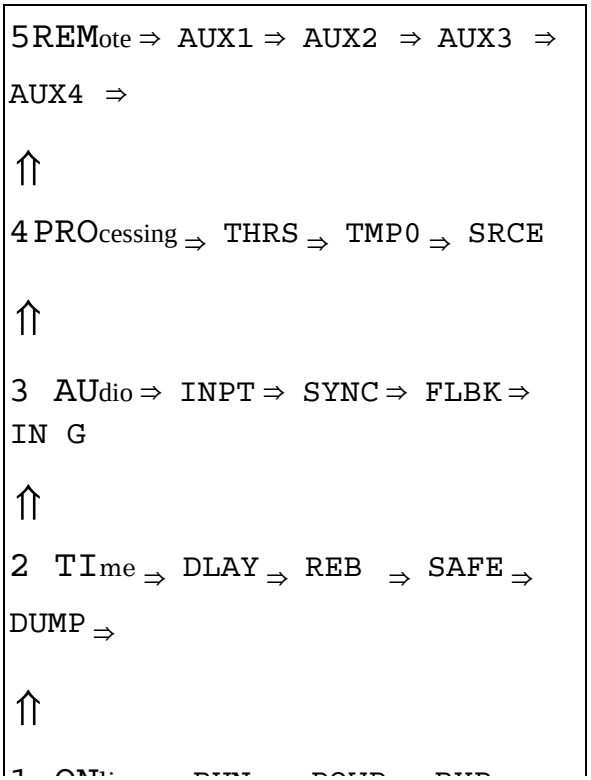
- The minimum fixed delay the BD600 will allow is 10 milliseconds. The absolute delay time through the unit will depend on whether analog or digital inputs or outputs are being used.
- Broadcast *profanity delay* functions such as *rebuild* are only operative in *precision delay* mode at delay values of 100 milliseconds and above.
- The fixed delay writes data continuously into the 10-second buffer. Changes in delay value changes the position of the play head, not the record head. That means that, if the delay length is adjusted by ear, the user doesn't have to wait for new input audio to check the adjustment. As an example, while listening to an audio source, try adjusting the seconds digit upward. It is easy to play the same 1-second piece of input audio ten times.
- Changes to delay values are smoothed, meaning that in most cases small changes can be made on air. A large change will still be smoothed, but the discontinuity in program material may be apparent.

Chapter 3 Configuration

There are a number of adjustable values used by the BD600. *Configuration* mode gives access to these values and allows them to be changed. This chapter covers the configurable variables for the basic BD600. Configuration of optional features is covered in the appendices.

The *configuration* mode is operated by the front panel buttons, which are used to navigate through a map of configuration variables. The WAIT FOR SAFE and WAIT AND EXIT buttons are used to move left and right across the map. The REBUILD and RAMP TO ZERO buttons are used to adjust the values of individual variables. The CONFIG button will move to the left side of the map and, if pressed while already on the left side, will move up through the levels. The SNEEZE button is used to reset a selected variable to the factory default.

See the side-bar for a partial map of the configuration parameters. Complete information is provided in a following table.



Basic Operation Example

From *bypass* mode, press CONFIG. The display changes to show **`CONF`**. Press CONFIG again to move up the map. The first press will move to **`1 ON`**. The next will move to **`2 TI`**. Now press the WAIT AND EXIT button a few times to move over to the **`REB`** variable (rebuild time). Notice that the SNEEZE button's LED is not lit. This means that the **`REB`** variable is set to the factory default. Use the RAMP TO ZERO button to change the value. Notice that the SNEEZE button lights up. Press the SNEEZE button to reset the parameter back to factory default.

Another Example

If the BYPASS button is not illuminated, press BYPASS. Next, press CONFIG. Once the display shows **`CONF`**, press the RAMP TO ZERO button. The display changes to **`1 ON`**. Now press the WAIT AND EXIT button once.
The display changes to **`RUN`**. To check the run mode, press the REBUILD or RAMP TO ZERO button. The display changes to show **`LIVE`**, indicating "go into *live* mode when exiting from bypass." To change the run mode, press the RAMP TO ZERO button. Use the REBUILD and RAMP TO ZERO buttons to go up and down through the four possible values for the run parameter.
Press BYPASS to exit from *configuration* mode and return to *bypass* mode. Any changes made will remain until they are reconfigured.

Password Protection

If desired, *configuration* mode may be password protected. The display will then show `P---` when the CONFIG button is pressed. To enter *configuration* mode, the user must first press the CONFIG button, then a single other button (password) and then release the CONFIG button. Pressing the wrong button will return the unit to *bypass* mode. Change or disable the password button using the `PASS` configuration variable.

⇒ *See page 26 for more information.*

Restoring Factory Defaults

All factory defaults may be restored by holding down the PANIC button while power is turned on. This will also reset the above Password.

Keep holding PANIC down until the display shows "**`Return to factory defaults ?`**." The message text will be scrolled marquee-fashion across the display. All buttons will be off except WAIT AND EXIT which will be flashing, indicating “yes” and REBUILD which will be lit steadily, indicating “no.” Press WAIT AND EXIT to answer “yes.”

Individual configuration values may be set to factory default by using the SNEEZE button while the value is selected. The LED on the SNEEZE button is lit if the variable is *not* set to factory default.

Table of Configuration Variables

Note: Full descriptions of the selectable values are available in pages following this table.

4 Character Identifier	*Description*	*Units*	*Range of Values*	*Default Value*
CONF	***Start of Config Mode*** This selection has no configurable value. It indicates entry into *configuration* mode			
1 ON	***Online Parameters***			
RUN	***Run Mode*** Selects the mode the unit goes into from *bypass*. Select **MPD** to enable precision fixed delay	mode	LIVE REB WFS MPD	LIVE
POWP	***Power-Up Mode*** Selects which mode the unit goes to after power-up.	mode	INLN BYP PREV	BYP
BYP	***Bypass Mode*** Selects the *bypass* mode	mode	RLA DSP MUTE	RLA
DISP	***Display Digits*** Selects the number of digits after the decimal point in *profanity delay* mode	# of digits	OFF 0 1.1 2.22	2.22
LITE	***Display Brightness*** Sets the display brightness	level	LOW MID HIGH	MID
PASS	***Password*** Allows a password to be selected which would limit access to the *configuration* mode	button	NONE BYP WFS WAE REB RT0 SNEZ DUMP	NONE
JING	***Jingle File*** The name of the current jingle file	name	OFF ONE TWO THRE FOUR	OFF
2	***Time Parameters***			

TI				
DLAY	***Delay Length*** Maximum length to which the profanity delay will rebuild	seconds	MPD 4.0 6.0 8.0 ……. 40.0 60.0 80.0	8.0
REB	***Rebuild Time*** Amount of time it will take to rebuild the delay from 0 seconds to maximum	seconds	varies with delay 1.0 … 10000	200
SAFE	***Safe Time*** Amount of time the profanity delay must have built up in order to be SAFE. Controls the lighting of the DUMP button and RLA2 outputs	seconds	1.0 1.5 2.0 2.5 ……. 8.5 9.0 9.5 10.0	4.0
DUMP	***Dump Amount*** Number of seconds of audio that will be dumped when the DUMP button is pressed	seconds	1.0 1.5 2.0 2.5 ……. 8.5 9.0 9.5 10.0	4.0
PANC	***Panic Mute Time*** The time in seconds for which the output mutes if no selected jingle is found when PANIC is pressed	seconds	OFF 2.0 2.5 3.0 …….. 6.5 7.0 7.5 8.0	4.0
3 AU	***Audio Parameters***			
INPT	***Audio Input Source*** Select analog or digital audio inputs	source	ANA DIG	ANA
SYNC	***Audio Synchronization Source*** Determines the audio sample clock	source	44.1K 48K AES WCLK	44.1K

Table of Configuration Variables

FLBK	***Fallback Mode*** What to do if **SYNC** source is lost	action	ANA MUTE	MUTE
ING	***Input Attenuation*** Amount of attenuation or gain used at the input of the delay	decibels	-30.0 -29.5 -29.0 ..... 8.5 9.0 9.5 10.0	0.0
OUTG	***Output Attenuation*** Amount of attenuation or gain used at the outputs of the delay	decibels	-30.0 -29.5 -29.0 ..... 8.5 9.0 9.5 10.0	0.0
4PRO	***Performance Parameters***			
THRS	***Threshold Level*** Audio level (below maximum level) that is recognized as silence	decibels	-60 … 0	-60
TMP0	***Tempo Modification*** Controls how much the tempo is allowed to vary in order to improve the quality of audio processing	percent-age change allowed	0 10 … 190 200	0
SRCE	***Source for Processing*** Left/right mix of channels to be used in determining the best times to do audio processing during rebuild or ramp to zero	channel	LEFT LCEN CENT RCEN RIGHT	CENT
5REM	***Remote Control Parameters***			

AUX 1	***Function of AUX1 input***	OFF BYP CNF WFS WAE REB RMP0 SNEZ DUMP LIVE STAT PANC FULL MUTE SBRK RTB D-R W-R 0-R ONE TWO THRE FOUR	BYP
AUX 2	***Function of AUX2 input***	OFF BYP CNF WFS WAE REB RMP0 SNEZ DUMP LIVE STAT PANC FULL MUTE SBRK RTB D-R W-R 0-R ONE TWO THRE FOUR	DUMP
AUX 3	***Function of AUX3 input***	OFF BYP CNF WFS WAE REB RMP0 SNEZ DUMP LIVE STAT PANC FULL MUTE SBRK RTB D-R W-R 0-R ONE TWO THRE FOUR	SNEZ
AUX 4	***Function of AUX4 input***	OFF BYP CNF WFS WAE REB RMP0 SNEZ DUMP LIVE STAT PANC FULL MUTE SBRK RTB D-R W-R 0-R ONE TWO THRE FOUR	PANC
RLA 1	***RLA1 Relay Function*** The state during which RLA1 is energized	OFF BYP CNF WFS WAE REB RMP0 SAFE SNEZ DUMP LIVE STAT PANC FULL MUTE SBRK	DUMP
RLA 2	***RLA2 Relay Function*** The state during which RLA2 is energized. Note that this also controls the DUMP button light	OFF BYP CNF WFS WAE REB RMP0 SAFE SNEZ DUMP	SAFE

Table of Configuration Variables

		LIVE STAT PANC FULL MUTE SBRK	
BAUD	***Baud Rate*** The Baud Rate for the RS232 Connector	OFF 2400 4800 9600 1920*0* 3840*0* 5760*0* 7680*0* 11520*0*	OFF

Note: Configuration for optional features is discussed in the Appendices.

Configuration Variables

A number of configuration variables are specific to either the Basic Remote or Extended Remote models – these are covered in separate appendices.

BYP Bypass mode

When the BD600 is bypassed, internal relays normally connect the analog and digital outputs to their respective inputs. This also occurs when the unit is powered down. In some circumstances it may be preferable to change this behavior, for example, if the unit is fed with an analog signal but the output is taken from the digital output. In this case, `DSP` bypass may be preferred, where the inputs and outputs are connected electrically according to the `INPT` configuration. The BD600 may also be configured to `MUTE` its outputs when bypassed.

DISP Display Digits

The number of digits after the decimal point showing the current delay amount in *profanity delay* mode. The BD600 has a four-digit numeric display used to show the delay amount in hundredths of seconds. As the delay rebuilds or ramps to zero, the last digit can change rapidly enough to be distracting to the operator. By changing the number of display digits to two, one, or even none, this source of distraction can be reduced greatly or eliminated. Since the operator may only need to know that the BD600 is in *rebuild*, and whether it is *safe* or not, the operator may choose not to have the delay time presented in such high resolution.

DLAY Delay Length

Delay length controls the maximum length of the broadcast delay. This adjustment may select a delay length of from 4.0 to 80.0 seconds. Select a length allowing the operator to dump multiple offending phrases without impairing operator efficiency. A length which is too short will not allow the operator enough time to delete offending speech, while a length that is too long increases the amount of time required to exit from the delay at the start of a break or end of a show.
If **`MPD`** is selected, the maximum delay is determined by the precision delay setting, allowing the normal *profanity delay* functions to be used to enter and leave *precision delay* mode.

DUMP Dump Amount

This is the amount of time deleted from the delay when the DUMP button is pressed in *profanity delay* mode. If the DUMP button is pressed when less than this amount of time is in the delay, then the entire contents of delay are deleted.

FLBK Fallback

If AES/EBU or Wordclock is selected as a sync source and there is no suitable signal present, the unit will declare an out-of-lock condition. If the unit is *in-line* (not in *bypass*) and an out-of-lock condition exists, the four-digit display will scroll the message **`NO LOCK`**. If the **`FLBK`** (fallback) variable is set to **`ANA`** (analog), then the analog input audio will be used until lock is restored. The analog input will be sampled at either 44100 or 48000, the sample rate chosen being whichever of the two rates is closer to the AES/EBU sample rate last received by the unit (or 48kHz if no AES/EBU signal has been present since power-up). The AES/EBU outputs will be active and the rate will be the same as the input analog sample rate. If the fallback variable is set to **`MUTE,`** the unit will mute the outputs until lock is regained.

IN G Input Gain

This controls an attenuator in the analog audio inputs of the BD600. The maximum level is 10dB (10dB of gain). The minimum level is -30dB (30dB of attenuation). While the meters immediately reflect changes to the input level configuration variable, this control will not affect levels seen at the ana-

log outputs when *bypassed*. This control should be set so that almost all of the meter segments light on a loud signal.

INPT *Input source*

This variable determines whether the **ANA**log or **dig**ital input is used. If it is changed, it will also change the **SYNC** variable – if **ANA** is selected, **SYNC** will be set to **48**, if **DIG** is selected, **SYNC** will be set to **AES**.

⇒ *See Selecting the sample rate on page 9,*

JING *Select current Jingle*

Select which of the four possible jingles (`ONE, TWO, THRE` or `FOUR`) on the Compact Flash card is active. Note that the jingle file will only be recognized if it is in the correct format. A `BAD JINGLE` message will appear briefly if an unsuitable or absent jingle file is selected.

⇒ *See Jingle files on the card on page 15 for more information.*

OUTG *Output Gain*

This controls attenuation in the analog and digital audio outputs of the BD600. The maximum level is 10dB (10dB of gain). The minimum level is -30dB (30dB of attenuation). This control does not affect output levels when *bypassed* unless `DSP` bypass has been configured.

PANC *Panic Mute Time*

If no suitable jingle is found on the Compact Flash card (or if the card is not inserted), this variable determines how long the outputs will mute when PANIC is pressed. In this case, if it is set to **OFF**, the PANIC feature is disabled.

PASS *Password*

Where some modicum of security is needed, this value may be changed to the identifier of a front panel button. If set, a user would have to go to BYPASS, press and hold CONFIG, then press the selected additional front panel button before releasing CONFIG, in order to get into *configuration* mode. A selection of **NONE** indicates that no second key is required.

POWP *Power-Up mode*

This controls whether the BD600 goes into bypass at power-up (**BYP**), goes directly into processing (**INLN**), or goes to the state it was in when last powered down (**PREV**). If **INLN** is selected, the unit will go directly to the in-line mode selected by the **RUN** configuration variable.

REB *Rebuild Time*

The rebuild time is the period the BD600 will need to build from zero delay to maximum delay or to ramp from maximum delay to zero. This is used to start up the delay or recover from DUMP. The factory default is 120 seconds, or two minutes, for a typical eight second maximum delay. The actual time to complete a rebuild may be different, depending on the audio content, and the settings of several other configuration parameters. Values above 9999 seconds will be displayed in minutes.

The displayed time for this variable will change in proportion if **DLAY** is changed, in order to keep the same quality of signal during rebuild or ramp to zero.

This value should be set following suitable listening tests and will normally be proportional to the maximum delay value, but should be increased for broadcasts with a music content or multiple speakers.

Configuration Variables

RUN Run mode

This controls which mode the BD600 enters when leaving *bypass* mode. The selections are *live, wait for safe, rebuild,* and *micro precision delay*. Each of these modes is described elsewhere in this chapter. The factory default is *live*.

SAFE Safe Time

In many broadcasting situations a control output from the broadcast delay will be used to control a telephone connection or auxiliary microphone input. The control input is only connected when enough delay has been built up to allow the operator to delete offending vocals. The delay length which must exist to allow the audio connection is called the *safe time*. The safe time is related to the reaction time of the operator and the complexity of what would be called *offending* speech. Normally, the safe time is several seconds. Since *wait for safe* is used to quickly build the delay to an amount long enough to be safe, the *safe time* is also the time value used by *wait for safe*. The DUMP button is illuminated only when the delay is longer than the safe time, unless configured otherwise.

SYNC Sample Rate Source

This variable selects whether the sample rate will be set to one of the two fixed sample rates (**44.1 48**), or will be set according to the AES/EBU input **AES** or the Wordclock input **WCLK**. If the AES/EBU digital inputs are in use, this will typically be set to **AES** or **WCLK**, but can be set to 44.1 or 48, in which case sample rate conversion will be enabled, allowing the digital signal to be received regardless of its sample rate (within reason). This variable also sets the sample rate of the AES/EBU output – for example, if it is set to 48, a received 44.1kHz digital input will be converted internally to 48kHz, producing a 48kHz digital output.

SRCE Source

This selects the amount of signal from each channel that will be fed into the signal processor for use in determining best time-to-process. If the unit is unable to pick good times-to-process, artifacts will be introduced into the output audio. This value may be set to one of five values, from left to right, **LEFT LCEN CENTR RCEN RITE. LEFT** indicates all of channel 1 and none of channel 2. **RITE** (right) indicates all of channel 2. **CENTR** (center) indicates an even sample of both. **LCEN** indicates a blend of mostly left (channel 1) and some right (channel 2). This adjustment does not affect the audio signal levels seen at the outputs.

If only one channel is used for input, set the source to that channel (**LEFT** or **RITE**). If one channel is usually of poorer quality (i.e., a telephone), give the other channel priority. For instance, if channel 1 is the local microphone and channel 2 is telephone, you might select **LEFT**. If channel 2 is a mix of local microphone and telephone, and channel 1 is never used, select **RITE**.

TMPO Tempo Modification

Controls how much the tempo is allowed to vary in order to improve the quality of audio processing. This will normally be set to the default value.

THRS Threshold Level Adjustment

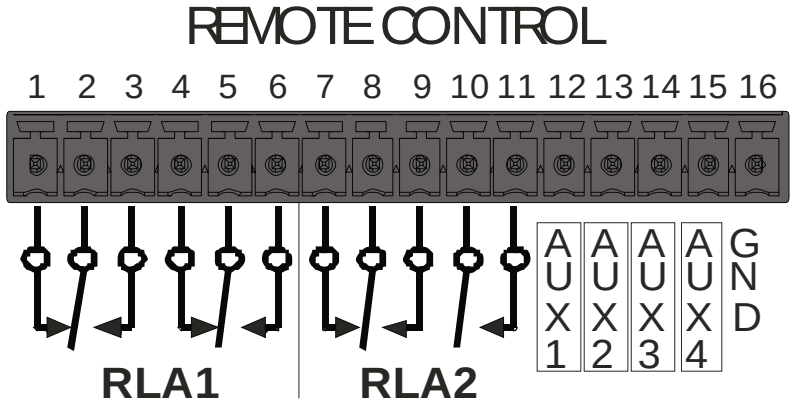
This value sets the threshold level used for the detection of *pauses* or silence. The default value has been optimized for normal usage. It may be necessary to adjust this value if the level of ambient noise is high. Great care should be taken when adjusting this value, as setting the threshold too high or too low may impair the catchup operation. The effects of changing this setting are best observed while rebuilding. This will normally be set to the default value.

Appendix A Basic Remote Control

The BD600 with the Basic Remote Control feature has four configurable inputs and two configurable multipole relay outputs.

Basic Remote Connector

The basic remote control connector is a 16-pin Euroblock socket on the rear panel. A range of plug-in connectors is available to facilitate wiring. A terminal block type connector is supplied with the BD600.



Outputs

There are two outputs available:

RLA1 – this is a two pole changeover (DPDT) relay rated at 1A 30V DC or 125V AC.
RLA2 – this is a two pole relay with one changeover contact and one normally open contact, both rated at 1A 30V DC or 125V AC. Note that RLA2 is driven in common with the DUMP light, so if its source is changed from the default **`SAFE`** value, the DUMP light will not operate as described in this manual.

These outputs can be configured by using normal *configuration* mode operations to get to 5REM and then selecting RLA1 or RLA2 as appropriate. The relays may be activated as below:

`OFF` never
`BYP` when bypassed
`CNF` during *configuration* mode
`WFS` when WAIT FOR SAFE is active
`WAE` when WAIT AND EXIT is active
`REB` when REBUILD-ing
`RMP0` when RAMP-ing TO ZERO
`SAFE` when the delay is greater than the configured safe time
`SNEZ` when SNEEZE is active
`DUMP` when the DUMP button is pressed
`LIVE` when the delay is at 0.00
`STAT` when the delay value is stable and non-zero
`PANC` when in *panic* mode
`FULL` when the delay is at maximum
`MUTE` when the output is muted
`SBRK` during a Station Break Insert operation (see below)

The default value for RLA1 is **`DUMP`** and for RLA2 is **`SAFE`**.

Inputs

There are four input controls, ***AUX1*** to ***AUX4***. They should be actuated by shorting them to ***GND***. Do not apply a voltage to these inputs as it may damage the unit. These inputs may be configured to replace existing push buttons or to provide other functions that cannot be achieved with the normal front panel controls.

OFF the input is disabled

BYP same as BYPASS button

CNF same as CONFIG button

WFS same as WAIT FOR SAFE button

WAE same as WAIT AND EXIT button

REB same as REBUILD button

RMP0 same as RAMP TO ZERO button

SNEZ same as SNEEZE button

DUMP same as DUMP button

PANC same as PANIC button

LIVE go immediately to zero delay. May cause a discontinuity in output audio

STAT go to *static* mode - cancel any REBUILD or RAMP TO ZERO operation

FULL go at once to maximum delay. May cause a discontinuity in output audio

MUTE mute the audio outputs while active

SBRK see page 29 for information on the Station Break Insert feature

RTB Ramp To Bypass – RAMP TO ZERO, then BYPASS the unit

D-R DUMP, then REBUILD

W-R if live, go to REBUILD else WAIT AND EXIT

0-R if live, go to REBUILD else RAMP TO ZERO

ONE make jingle **ONE** the current jingle

TWO make jingle **TWO** the current jingle

THRE make jingle **THREE** the current jingle

FOUR make jingle **FOUR** the current jingle

The factory defaults are:

AUX1 – **BYP** AUX2 – **SNEZ** AUX3 – **DUMP** AUX4 – **PANC**

A simple circuit for triggering DUMP:

With factory default settings, connect your push-button between pins 14 and 16.

Station Break Insert

This remote-only function mutes the output for 4.0 seconds while continuing to enter input audio into the delay – typically, the RLA1 or RLA2 outputs will be configured to trigger an external cart machine to seamlessly insert a Station Identification Break or other jingle into the program material without

loss of input audio. To use this feature successfully, the current delay value must be 4 or more seconds below the maximum. On completion, the delay value will be 4.0 seconds longer than when it was triggered, or the configured `DLAY` value, whichever is shorter.

Appendix B Extended Remote Control

This section under construction

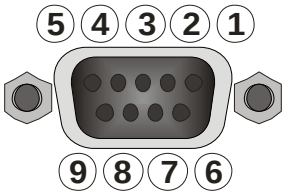
Appendix C RS232 Remote Control

A BD600 can be completely configured and operated from a personal computer or user-supplied custom control system. The female 9 pin RS232 connector on the rear panel is the mate for the male COM port on a typical desktop computer. The BD600 operates as Data Communication Equipment (DCE) - the same as a modem. A straight through (pin 1 connected to pin 1, etc.) cable may be used to connect the BD600 to a unit operating as Data Terminal Equipment (DTE), such as a personal computer.

The default characteristics of the RS232 connection are 9600 baud, 8 bits, 1 stop bit and no parity (9600, 8, 1, none). The **BAUD** rate may be changed via the configuration system.

The following table is the pin number, label, and direction relative to the BD600. The label is the same as used by the terminal or PC that will be connected to the BD600. Since the BD600 is DCE, the labels and direction are opposite in meaning to those of the DTE definitions.

Pin 1 DCD (out)
Pin 2 RxData (out)
Pin 3 TxData (in)
Pin 4 DTR (in)
Pin 5 Gnd
Pin 6 DSR (out)
Pin 7 RTS (in)
Pin 8 CTS (out)
Pin 9 RI (out)



The BD600 does not require the hardware control lines. Only RxData, TxData and Gnd are necessary.

The BD600 only sends messages as a response to a poll from a host computer. The host computer must not send a message unless it has received a > character (hex 3E) or unless it has not heard from the BD600 in 100mS. An overflow or bad message will be answered with a E> (hex 45, 3E).

The right-hand display bar segment will flash when receiving RS232 information. A terminal or PC terminal emulator can usefully be used to debug and demonstrate command sequences.

Protocol

The following page has a list of single byte commands which are available to the host computer. The table lists the response generated by the BD600. All commands will generate a response:

!> indicates command processed with no other data returned

X> indicates command not valid at this time

E> indicates serial port error or unrecognized command

Redundant commands will be answered with a !> or X> as appropriate. *End of sneeze* and *mute* will put the unit back in the mode it was in before the *sneeze* or *mute* started. All transmitted and received bytes are ASCII characters between ‘0’ and ‘_’ or 30 hex and 5F hex, as well as line feed (0A hex) and carriage return (0D hex).

Protocol notes

The unit is allowed to send an error message (E> or X>) at any time. Any interrupted message is terminated when the error message is sent, so the > character will be permission for the external device to send a new command. Command letters may be upper case or lower case. The command set is based on that of the Eventide BD500 with necessary differences.

0 requests static at 0 delay	puts the unit *in-line*. If the unit was in BYPASS and the `RUN` variable specifies `MPD`, MPD mode will be entered, using the selected delay. Otherwise the unit will enter *profanity delay* mode at zero delay (*live*).
1 increments MPD digit	note: MPD must be entered via configuration change to the `run` mode parameter.
2 decrements MPD digit	
3 selects MPD digit	
5 starts mute	use the K command to un-mute. Works in MPD and *profanity delay* modes. The system will continue whatever it was doing before, but the output will be silent. Mute will be cancelled on entering BYPASS.
6 initiates or cancels **station break insert**	see page 29 for information on the Station Break Insert feature.
7 initiates **ramp to bypass**	performs *ramp to zero* and then automatically switches to *bypass*.
8 initiates **wait for bypass**	performs *wait and exit* and then automatically switches to *bypass*.
A initiates **wait and exit**	
B switches to **bypass** mode	
C requests config values	shows the current settings of each of the config values. This long response includes multiple records, each consisting of a 4 byte config variable name, followed by an ASCII equal sign (=), followed by a 4 byte config value, followed by hex 0D,0A (carriage return, line feed). The last record will be followed by a >. None of the 4 byte values contain >. The records correspond to configuration variables described in Chapter 3 and consist of ASCII characters of the set 0 through 9, A through Z, space and dash. Records will be padded with trailing spaces where necessary to bring them up to 4 bytes.
D performs a **dump**	note: this command will NOT drive RLA1 or RLA2, even if configured for `DUMP`.
E entire config table	dump entire config table with all variables and all available values. This long response includes multiple records, each consisting of a 4 byte config variable name, followed by an ASCII equal sign (=), followed by one or more 4 byte strings, each containing config values, separated by spaces, followed by a space and then hex 0D,0A (carriage return, line feed). The last record will be followed by a >. None of the 4 byte values contain >. The records correspond to configuration variables described in Chapter 3 and consist of ASCII characters of the set 0 through 9, A through Z, space and dash. Records will be padded with trailing spaces where necessary to bring them up to 4 bytes. Note that the `REB` values will depend on the current `DLAY` value.
F go to **static** at full delay	if the RUN variable does not specify MPD, the unit goes to in-line, static and at full delay.
G go to next config variable	steps to next config variable. Responds with normal !>. Use X to request current config variable name and value. See also C, E, J, N, Q, V, X, and Y commands.
H go to **static** at current delay	cancels a **rebuild** or **ramp to zero**.
K ends a **sneeze** or **mute** or **station break**	

I enter **panic** mode

L requests levels	three-character response is left channel level followed by right channel level and terminated with >. Levels are reported using one digit ASCII hex of range 0 through 9, and A. Example: 25> is left channel level of 2, right channel of 5.
M requests mode	response is three characters of the form !m> where m is the current mode. Modes are A <wait and exit>, B <bypass>, H <static>, I <panic>, L <live>, M <mute>, P <micro precision delay>, R <rebuild>, S <sneeze>, W <wait for safe>, Z <ramp to zero>. note: zero delay and maximum delay are not modes; if the unit reaches maximum delay while in *rebuild*, it switches to *static* mode, while if it reaches zero delay while in *ramp to zero*, it switches to *live* mode.
N next config value	steps the current config variable to the next value. When the maximum value is reached, the next will be the minimum. Responds with normal "!>". This command does not change the stored config value, only the used value. Use the J command to save the current config variable. Use X to request current config variable name and value. See also G command.
P requests MPD delay	response is 8-digit (including decimal point) ASCII value of delay in milliseconds, followed by position indicator (1, 2, 3, 4, 5 or 6), followed by >. Note: This does not change the mode to MPD. Example: if delay is 1.1 seconds and the 4th digit is selected, the response will be “1100.0004>”.
Q resets config stepping	points at start of *configuration* mode. Used with C, E, G, J, N and V, X, and Y commands to make configuration changes to the BD600.

R initiates **rebuild**

S starts a **sneeze**	see K command for end-**sneeze**.
T requests current delay	response is 4-digit decimal ASCII value of delay in 10s of milliseconds, followed by >.
U requests current delay as hex	sends delay amount in 10s of milliseconds as hexadecimal using 4 chars of ASCII hex followed by H>.
V Eventide Factory Defaults	sets factory defaults for all config variables (except baud rate). System must be in **bypass**.

W initiates **wait for safe** note: when the unit reaches safe, it will switch to *rebuild* mode.

X examine config	gives current config variable and value. Responds with a 10-character message consisting of a four-character config variable identifier, an ASCII equal sign (=), the four-character value of the config variable, and a >. See G, N and Q.
Y first value	sets the current config variable to the first value. Useful for making automated configuration changes. See C, E, G, J, N, Q, V and X commands.

Z initiates **ramp to zero**

RS-232 Command Examples and Tables

This section offers organizational information and help information for using RS-232 commands.

Profanity Delay Commands

These are the profanity delay commands. Note that some rarely used commands are left out of this section.

L	requests levels
M	requests mode
T	requests current delay
U	requests current delay/hex
0	go to static at 0 delay
H	go to static at current delay
B	switches to *bypass* mode
W	initiates wait for safe
A	initiates wait and exit
Z	initiates ramp to zero
R	initiates rebuild
S	starts a sneeze
K	ends a sneeze
D	performs a dump

Micro Precision Delay Commands

These are the fixed delay commands.

L	requests levels
B	switches to *bypass* mode
0	switches from bypass to in-line
1	increments MPD digit
2	decrements MPD digit
3	selects MPD digit
P	requests MPD delay value

The RS232 commands allow the front panel of the BD600 to be completely replicated in function (and in form) by a remote device. A computer with a terminal emulator may use these commands to prove that all of the information and control are available. Use the T, M and P commands to watch modes and delays change as commands are issued.

Configuration Mode Commands

The RS232 configuration commands step through the configuration variables in much the same way the front panel does. Use the G command to step to the next variable. Use the N command to step through values for a single variable.

Most values will be used by the BD600 immediately after they are changed, so care must be taken not to change those that may cause undesirable artifacts on air.

M	requests mode
B	switches to *bypass* mode
0	switches from bypass to in-line
C	dump values for all config variables
E	dump possible values for all variables
G	go to next config variable
N	next value for this variable
Q	back to first variable
V	Eventide Factory Defaults
X	examine current variable
Y	first value for this variable

Example configuration operations

Note that you must wait for a prompt before sending each character.

To change the rebuild rate from whatever it happens to be to 240, you can send

Q G G G G G G G G Y N N N N N.

(Spaces are shown to increase readability and would not be sent.) This sequence says: go to first variable, then step through the variables to the `REB` variable, then set it to the first value, then step through to the 6th value which is 240 (for an 8.0 seconds `DLAY` value).

In order to change the full delay amount, the unit has to be placed into bypass. This sequence will change the maximum delay to 4.0 seconds and put the unit back *in-line*.

Q G G G G G G G G Y N B 0.

Note that if you issue the B command while the unit is already bypassed, you will get an error message. Your sequence may expect the error message and ignore it.

Appendix D Diagnostics

Start-up Switches

The BD600 has operations which are used in the factory to prepare the unit to be shipped. Each operation is performed by turning on the unit while holding down a button until the version number message goes away. Some of them may post a “do you want to..” type message, with the WAIT AND EXIT button blinking to indicate “yes” and the REBUILD button lit steadily to indicate “no.”

Restore Factory Defaults - PANIC button

This function restores all configuration values to the factory defaults. In the event of serious system malfeasance, this function should be tried, and if it does not restore normal behavior, do the following to clear memory.

Clear all Memory – RAMP TO ZERO button

This function clears all memory and returns the unit to the state at which it left the factory.

Perform Production Self-Test - SNEEZE button

This function goes into a series of self tests. Many of these tests cannot pass unless loop-back connectors are installed on audio and control connectors. **These tests should only be run under instruction from Eventide as some of them can erase internal programs**.

Other Functions

The remaining front panel keys are unused at this time or are reserved for factory purposes.

Specifications

Physical:

Size inches	1.75h x 19w x 10.5d
Size centimeters	4.4h x 48.3w x 26.7d
Weight	6 lbs. net
Shipping weight	10 lbs
Power	50 watts, 100-240V AC 50/60Hz
Fuse	4-Amp 250V AC Fast Blow on internal power supply unit

AES/EBU Digital inputs/outputs:

Connector	XLR
Sample Rate	33-49kHz, 24 bits/sample

Analog inputs/outputs:

Connector	XLR, pin 2 hot, true differential balanced +4dBm nominal, +26dBm max
Sample Rate	44.1, 48kHz, 24 bit/sample
Frequency Response	20Hz to 20kHz, + - 1dB at 48K sampling
Signal to Noise ratio	>100dB, 'A' weighted
Dynamic Range	>100dB
Distortion	<.003% @ 1kHz, 1dB below clipping in stable delay state

Basic Rear Panel Control Signals:

Control Signals

Remote outputs	relay contacts - 1A 30V DC, 125V AC maximum
Remote inputs	closure to ground

Extended Remote Rear Panel Control Signals:

Remote Field Contact Supply Voltage

Voltage	min of
Current	100mA

External Power Supply Bias

Voltage	maxim

This section under construction

Control Signals

Remote outputs	sink a 00mA each with all outputs driven
Remote inputs	1mA at 4.5V minimum, 25V max

These specifications are subject to change without notice or obligation.

LIMITED WARRANTY

The above-identified Eventide unit covered by this warranty is built to exacting quality standards and should give years of trouble-free service. If you are experiencing problems which are not cleared up in this manual, your recourse is this warranty.

What the warranty does and does not cover

Eventide Inc. warrants the above-identified unit to be free from defects in workmanship and material under normal operation and service for a period of one year from the date of purchase, as detailed below. At our discretion within the warranty period, we may elect to repair or replace the defective unit. This means that if the unit fails under normal operation because of such defect, we will repair the defective unit at no charge for parts or labor. We also assume a limited responsibility for shipping charges, as detailed below.

The warranty does not extend beyond repair or replacement as stated herein and in no event will we be responsible for consequential or incidental damages caused by any defect, and such damages are specifically excluded from this warranty. Our sole obligation is to repair or replace the defective unit as described herein.

The warranty DOES NOT COVER any damage to the unit regardless of the cause of that damage. The unit is a complex piece of equipment that does not react well to being dropped, bounced, crushed, soaked or exposed to excessively high temperatures, voltages, electrostatic or electromagnetic fields. If the unit is damaged for these or similar causes, and the unit is deemed to be economically repairable, we will repair it and charge our normal rates.

The warranty DOES NOT COVER shipping damage, either to or from Eventide. If you receive a new unit from us in damaged condition, notify us and the carrier; we will arrange to file an insurance claim and either repair or exchange the unit.

If you receive a new unit from a dealer in damaged condition, notify the dealer and the carrier.

If we receive the unit from you with apparent shipping damage, we will notify you and the carrier. In this case, you must arrange to collect on any insurance held by you or your carrier. We will await your instructions as to how to proceed with the unit, but we will charge you for all repairs on damaged units.

Who is covered under the warranty

The warranty applies to the original purchaser of a new unit from Eventide or an Authorized Eventide Dealer. Demo units are also covered by this warranty under slightly different circumstances (see below). Units that are used, or have been used as part of a rental program, are not covered under any circumstances.

It is your responsibility to prove or to be able to prove that you have purchased the unit under circumstances which effect the warranty. A copy of your purchase invoice is normally necessary and sufficient for this.

If you have any questions about who is an Authorized Eventide Dealer, call us.

Units with the serial number plate defaced or removed will not be serviced or covered by this warranty.

When the warranty becomes effective

The one-year warranty period begins on the day the unit is purchased from an Authorized Eventide Dealer or, if the unit is drop-shipped from Eventide, on the day shipped, plus a reasonable allowance for shipping delays. This applies whether or not you return your warranty registration form.

When we receive a unit, this is how we determine whether it is under warranty:

1. If the unit was shipped from our factory within the past calendar year, we assume that it is under warranty unless there is evidence to the contrary, such as its having been sold as used or rented, etc..

2. If the unit was shipped from our factory more than a calendar year ago, we assume it is not under warranty unless:

    a) There is a warranty registration form on file showing that it has been purchased within the past year under appropriate conditions.

    b) You send a copy of your purchase invoice indicating warranty status along with the unit.

3. If the unit was used as a demo, the warranty runs from the date that it was received by the dealer. The original purchaser gets the unexpired portion of that warranty.

When you send a unit for repair, you should indicate whether or not you believe it to be under warranty. If you do not say the unit is under warranty, we will charge you for the repair and we will not refund unless the charge was caused by an error on our part. If you believe the unit to be under warranty and you do say it is but we disagree, you will not incur any charges until the dispute is resolved.

Warranty Information

Reading the above, you can see that it is to your advantage to send in the warranty registration form when you purchase the unit. If we know who you are, we can send you updates and notifications, and advise you of our new products. It will also enable you to receive pre-shipment of certain parts.

Who performs warranty work

The only company authorized to perform work under this warranty is Eventide Inc., Little Ferry, New Jersey. While you are free to give personal authorization to anyone else (or to work on it yourself), we will not honor claims for payment for parts or labor from you or from third parties.

However, we and our dealers do try to be helpful in various ways:

1. Our dealers will assist, usually without charge during the warranty period, in:

    a) determining whether there is a problem requiring return to the factory, and

    b) alleviating user error or interconnection problems that may be preventing the unit from operating to its full capability.

2. We are available for telephone consultation if the dealer is unable to assist.

3. If a part is found to be defective during the warranty period and you wish to replace it yourself, we will normally ship the part immediately at no charge, provided your warranty registration form is on file. We reserve the right to request that the defective part be returned to us.

Shipping within the 50 United States

You are responsible for getting the unit to our door at no cost to us. We cannot accept collect or COD shipments.

We will return the unit to you prepaid, at our expense, using an expeditious shipping method, normally United Parcel Service. In areas not served by UPS we will ship by US Mail.

If you are in a hurry and want us to use a premium shipping method (such as air express, next day air, etc.), be sure you tell us and agree to pay shipping charges collect. If you specify a method that does not permit collect or COD charges, remit sufficient funds to prepay shipping.

Shipping outside the 50 United States

If you purchased the unit from a dealer in your country, consult with the dealer before returning the unit.

If you wish to return the unit to us, please note the following:

1. The unit must be prepaid to our door. This means that you are responsible for all shipping charges, including customs brokerage and duties. When a unit is shipped to us it must be cleared through United States Customs by an authorized broker. You must make arrangements for this to be done. Normally, your freight forwarder has a branch in the United States which can handle this transaction. We can arrange to clear incoming shipments for you. If you want our assistance, you must notify us before shipping the unit for repair, giving full details of the shipment, and including a minimum of $250.00 in US funds to cover the administrative and brokerage expenses. Any balance will be applied to the repair charges or refunded. If a balance is due to us, we will request a further prepayment.

2. All shipments will be returned to you collect. If this is impossible because of shipping regulations or money is due us, we will request prepayment from you for the appropriate amount.

3. All funds must be in $US. Payment may be made by check drawn on any bank in the US, or by telegraphic funds transfer to our bank. If you send US currency, be sure that it is sent by a method you can trace, such as registered mail. If you wish to pay by Letter of Credit, be sure that it affords sufficient time for work to be performed and the L/C negotiated, and that it is free from restrictive conditions and documentation requirements.

4. We reserve the right to substitute freight carriers. Although we will attempt to honor your request for a specific carrier, it is frequently necessary to select a substitute because of difficulties in communication or scheduling.

This warranty gives you specific legal rights and you may also have other rights which vary from location to location.

(c) 1999, 2000, 2003 Eventide Inc.

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